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09/766,247	01/19/2001	Sandy C. Shaw	A-69985/AJT/JED	8286

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EXAMINER
LY, ANH

ART UNIT	PAPER NUMBER
2172	

DATE MAILED: 02/20/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *19 January 2001* .

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-30* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-30* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

    If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All b)☐ Some * c)☐ None of:

        1.☐ Certified copies of the priority documents have been received.

        2.☐ Certified copies of the priority documents have been received in Application No. _____ .

        3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

    a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)   4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)   5) ☐ Notice of Informal Patent Application (PTO-152)

3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *4 & 5* .   6) ☐ Other: .

DETAILED ACTION

1.   Claims 1-30 are pending in this application.

Claim Objections

2.   Claim 2 objected to because of the following informalities:

The first line of claim 2, "The method of claim1," replace with –The method of

claim 1, --.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

3.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
> the prior art are such that the subject matter as a whole would have been obvious at the time the
> invention was made to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was made.

4.   Claims 1-3, 5-8, 11-26 and 28-30 are rejected under 35 U.S.C. 103(a) as being

unpatentable over US Patent No. 6,389,428 issued to Rigault et al. (hereafter Rigault) in

view of US Patent No. 6,453,246 issued to Agrafiotis et al. (hereafter Agrafiotis).

With respect to claim 1, Rigault discloses providing a plurality of target strings

comprising datasets (sequence data such as DNA sequence data or protein sequence

data: col. 2, lines 66-67 and col. 3, lines 1-4); generating a comparison string

comprising a dataset using an iterative algorithm (using BLAST algorithm to compare all

sequence: col. 12, lines 47-53 and heuristic search algorithms: col. 1, lines 55-60); the

domain of an iterative function; scoring of the comparison string by evaluating a function

having the comparison string and one of the plurality of target strings as inputs, such

that the evaluation may be repeated for a number of the other plurality of target strings

(col. 12, lines 50-56; also see col. 13, lines 7-26 and col. 14, lines 40-67); and repeating

the generating, scoring, and mapping or marking for a plurality of comparison strings if

desired (see table II, mapping information and scoring system, col. 18, lines 1-67).

Rigault does not explicitly indicate, "comparison string is calculated from a point

in any set of points; and mapping or marking the point if the score or some other

property corresponding to the point meets some relevant criteria; and examining a

subregion with higher resolution if points in the subregion are of interest."

However, Agrafiotis discloses set of point (col. 11, lines 26-28) and computing

the point/coordinating of an object (col. 10, lines 38-44); and points with color (col. 4,

lines 11-21 and col. 9, lines 30-43).

Therefore, it would have been obvious to a person of ordinary skill in the art at

the time the invention was made to combine the teachings of Rigault with the teachings

of Agrafiotis so as to have a comparison strings between sequence data from the

database with the target string as input sequence data. This combination would apply

self-organizing algorithm to measure of similarity/dissimilarity relationships of sequence

data (Agrafiotis – col. 3, lines 35-45) and to be for deriving proximity data and a display

map for the object (col. 3, line 50-52 and col. 3, lines 65-67 and col. 4, lines 1-4) in the comparison of the dataset or sequence data of bio-informatics environment.

With respect to claim 2, Rigault discloses wherein the step of providing the comparison string comprises transforming the numbers of the comparison string to have values within a set of interest (abstract and col. 2, lines 48-52).

With respect to claim 3, Rigault discloses a method as discussed in claim 1.

Rigault does not explicitly indicate, "wherein the set of points comprises a region of the complex plane."

However, Agrafiotis discloses plane as well as coordinating for points (col. 1, lines 50-64).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to combine the teachings of Rigault with the teachings of Agrafiotis so as to have a comparison strings between sequence data from the database with the target string as input sequence data. This combination would apply self-organizing algorithm to measure of similarity/dissimilarity relationships of sequence data (Agrafiotis – col. 3, lines 35-45) and to be for deriving proximity data and a display map for the object (col. 3, line 50-52 and col. 3, lines 65-67 and col. 4, lines 1-4) in the comparison of the dataset or sequence data of bio-informatics environment.

With respect to claims 5-6, Rigault discloses a method as discussed in claim 1.

Rigault does not explicitly indicate, "wherein the step of generating the comparison 30 string comprises laying a grid over the set of points; wherein the step of

generating the comparison string comprises restarting the step of generating the

comparison string if the iteration has become unbounded."

However, Agrafiotis discloses set of point (col. 11, lines 26-28) and iteration with

unbounded (col. 6, lines 58-61; also see col. 10, lines 22-35).

Therefore, it would have been obvious to a person of ordinary skill in the art at

the time the invention was made to combine the teachings of Rigault with the teachings

of Agrafiotis so as to have a comparison strings between sequence data from the

database with the target string as input sequence data. This combination would apply

self-organizing algorithm to measure of similarity/dissimilarity relationships of sequence

data (Agrafiotis – col. 3, lines 35-45) and to be for deriving proximity data and a

visualization display map for the object (col. 3, line 50-52 and col. 3, lines 65-67 and col.

4, lines 1-4) in the comparison of the dataset or sequence data of bio-informatics

environment.

With respect to claims 7-8, Rigault discloses wherein the step of generating the

comparison string comprises generating a comparison string of any length (col. 12, lines

42-59); wherein the step of scoring comprises preliminary testing of properties of the

comparison string alone as criteria to initiate scoring (col. 12, lines 47-59; also see col.

13, lines 7-14).

With respect to claims 11-14, Rigault discloses wherein the step of scoring

comprises a one-to-one comparison between corresponding numbers in the target

string and the comparison string (col. 12, lines 47-58; also col. 13, lines 7-24); wherein

the one-to-one comparison may be between corresponding sequential or

non-sequential numbers in the target string and the comparison string (col. 13, lines 46-58; also col. 14, lines 20-51); wherein the step of scoring involves studying the behavior of the scoring function, such as determining the function's minima and maxima (col. 8, lines 48-52 and col. 9, lines 39-44); and wherein only the comparison string is used as relevant input to the scoring function (col. 12, lines 50-59).

With respect to claims 15-16 and 21-24, Rigault discloses a method as discussed in claim 1. Also Rigault discloses comparison string being in the memory, a database or a table (see abstract, col. 2, lines 48-52).

Rigault does not explicitly indicate, "wherein the step of mapping or marking comprises storing the coordinates of point corresponding to the target string; wherein the step of mapping or marking comprises marking the point on a visual display by changing some graphical property of the corresponding pixel, such as color; wherein the points of interest are analyzed and/or compared by examining, either visually or mathematically, their relative locations and/or absolute locations within the region; wherein the points of interest are analyzed and/or compared by examining, either visually or mathematically, metrics other than location; wherein the metrics can be represented by graphic properties such as shading; and wherein the step of examining a subregion further comprises repeating the examining step for smaller subregions."

However, Agrafiotis discloses set of point (col. 11, lines 26-28) and computing the point/coordinating of an object (col. 10, lines 38-44); and points with color (col. 4, lines 11-21 and col. 9, lines 30-43); visualization display (col. 16, lines 31-46; also see col. 21, lines 15-29); and graphical property of the pixel (size, color gray scale: col. 4,

lines 11-21); metrics (col. 12, lines 36-52 and col. 16, lines 31-36; also see col. 21, lines

15-29); shading area (col. 9, lines 30-35, also see fig. 5); and smaller region (col. 4,

lines 11-21 and col. 9, lines 30-43).

Therefore, it would have been obvious to a person of ordinary skill in the art at

the time the invention was made to combine the teachings of Rigault with the teachings

of Agrafiotis so as to have a comparison strings between sequence data from the

database with the target string as input sequence data. This combination would apply

self-organizing algorithm to measure of similarity/dissimilarity relationships of sequence

data (Agrafiotis – col. 3, lines 35-45) and to be for deriving proximity data and a

visualization display map for the object (col. 3, line 50-52 and col. 3, lines 65-67 and col.

4, lines 1-4) in the comparison of the dataset or sequence data of bio-informatics

environment.

With respect to claims 17-20, 25-26 and 28-29, Rigault discloses wherein the

criteria comprises the comparison string having the highest score, where the score is

based on some similarity measure to the target string 9highest score: col. 12, lines 50-

53 and col. 14, lines 45-48); wherein the step of examining the subregion comprises

changing the format of the target and/or comparison string in order to improve the

precision and resolution of the method (col. 7, lines 60-67); wherein the methodology

used in the reformatting process is based on methodologies such as Simulated

Annealing, Hill Climbing Algorithms, Genetic Algorithms, or Evolutionary Programming

Methods (algorithms: col. 1, lines 25-35 and lines 55-60); wherein the reformatting

process is automated (col. 4, lines 6-17, also see col. 1, lines 18-21 and col. 7, lines 60-

67); wherein the uses for the method comprise analyzing large datasets, such as for

DNA sequence data, protein sequence data, gene expression datasets, demographic

data, statistical data, and clinical (patient) data and wherein the uses of the method

comprise analyzing datasets consisting of heterogeneous data, such as both gene

expression data and clinical (patient) data (col. 1, lines 25-54); wherein the steps may

be automated (col. 4, lines 6-17); and wherein separates processes involved in

generating each comparison string, scoring each comparison string, or transforming

each comparison string or target string to a value set of interest may be processed

simultaneously by a plurality of processors (col. 4, lines 30-38).

With respect to claim 30, Rigault providing a plurality of target strings comprising

datasets; generating a comparison string comprising a dataset using an iterative

algorithm, and the numbers of the comparison string are transformed to have values

within a set of interest; scoring of the comparison string by evaluating a function having

the comparison string and one of the plurality of target strings as inputs, such that the

evaluation may be repeated for a number of the other plurality of target strings; the

target string or properties of the comparison string are stored in memory, a database or

a table (a database in memory: col. 2, lines 48-50), and wherein tile relevant criteria

comprises the comparison string having the highest score, where the score is based on

some similarity measure to the target string; repeating the generating, scoring, and

mapping or marking for a plurality of comparison strings if desired; (sequence data such

as DNA sequence data or protein sequence data: col. 2, lines 66-67 and col. 3, lines 1-

4; using BLAST algorithm to compare all sequence: col. 12, lines 47-53 and heuristic

search algorithms: col. 1, lines 55-60; col. 12, lines 50-56; also see col. 13, lines 7-26

and col. 14, lines 40-67; and see table II, mapping information and scoring system, col.

18, lines 1-67; biomolecular database in the memory: col. 2, lines 48-52; the highest

score: col. 14, lines 45-48; also see col. 12, lines 50-53).

Rigault does not explicitly indicate, "the comparison string is calculated from a

point in a region of the complex plane comparison string is calculated from a point in

any set of points; and mapping or marking the point if the score or some other property

corresponding to the point meets some relevant criteria; and examining a subregion

with higher resolution if points in the subregion are of interest, and their relative

locations and/or absolute locations within the region or other metrics representing the

graphic properties of the corresponding comparison strings the point is marked on a

visual display by changing some graphical property of the corresponding pixel."

However, Agrafiotis discloses set of point (col. 11, lines 26-28) and computing

the point/coordinating of an object (col. 10, lines 38-44); and points with color (col. 4,

lines 11-21 and col. 9, lines 30-43); visualization display (col. 16, lines 31-46; also see

col. 21, lines 15-29); and graphical property of the pixel (size, color gray scale: col. 4,

lines 11-21).

Therefore, it would have been obvious to a person of ordinary skill in the art at

the time the invention was made to combine the teachings of Rigault with the teachings

of Agrafiotis so as to have a comparison strings between sequence data from the

database with the target string as input sequence data. This combination would apply

self-organizing algorithm to measure of similarity/dissimilarity relationships of sequence

data (Agrafiotis – col. 3, lines 35-45) and to be for deriving proximity data and a

visualization display map for the object (col. 3, line 50-52 and col. 3, lines 65-67 and col.

4, lines 1-4) in the comparison of the dataset or sequence data of bio-informatics

environment.

5.   Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over US

Patent No. 6,389,428 issued to Rigault et al. (hereafter Rigault) in view of US Patent

No. 6,453,246 issued to Agrafiotis et al. (hereafter Agrafiotis), and further in view of US

Patent No. 5,416,848 issued to Young.

With respect to claim 4, Rigault in view of Agrafiotis discloses a method as

discussed in claim 1.

Rigault in view of Agrafiotis does not explicitly indicate, "wherein the set of points

further comprises points in and/or near the Mandelbrot Set or a Julia Set."

However, Young discloses Mandelbrot fractal set (col. 7, lines 18-22) and Julia

set for points (col. 4, lines 28-35).

Therefore, it would have been obvious to a person of ordinary skill in the art at

the time the invention was made to combine the teachings of Rigault in view of

Agrafiotis with the teachings of Young so as to have a comparison strings between

sequence data from the database with the target string as input sequence data. This

combination would provide the measurement of the points of image or fractal shape and

ordered color set and data compression of colors (Young – col. 5, 55-67 and col. 6,

lines 1-11) in the comparison of the dataset or sequence data of bio-informatics

environment.

6.   Claims 9-10 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable

over US Patent No. 6,389,428 issued to Rigault et al. (hereafter Rigault) in view of US

Patent No. 6,453,246 issued to Agrafiotis et al. (hereafter Agrafiotis), and further in view

of US Patent No. 5,838,832 issued to Barnsley.

With respect to claims 9-10, Rigault in view of Agrafiotis discloses a method as

discussed in claim 1.

Rigault in view of Agrafiotis does not explicitly indicate, "wherein the step of

scoring comprises some test of the comparison string using the target string and

wherein not all of the numbers in the comparison string or the target string must be used

in the test."

However, Barnsley discloses comparison test to determine the value to be met

(col. 12, lines 48-50).

Therefore, it would have been obvious to a person of ordinary skill in the art at

the time the invention was made to combine the teachings of Rigault in view of

Agrafiotis with the teachings of Barnsley so as to have a comparison strings between

sequence data from the database with the target string as input sequence data and

comparison test. This combination would provide the comparison of string to be

efficiently adapted and more accurately represent the original data set (Barnsley - col.

2, lines 48-56) in the comparison of the dataset or sequence data of bio-informatics

environment.

With respect to claim 27, Rigault in view of Agrafiotis discloses a method as

discussed in claim 1.

Rigault in view of Agrafiotis does not explicitly indicate, "wherein the uses for the

method comprise data compression."

However, Barnsley discloses compression data (col. 4, lines 17-24; also see col.

1, lines 64-67 and col. 2, lines 8-16).

Therefore, it would have been obvious to a person of ordinary skill in the art at

the time the invention was made to combine the teachings of Rigault in view of

Agrafiotis with the teachings of Barnsley so as to have a comparison strings between

sequence data from the database with the target string as input sequence data and

comparison test. This combination would provide the comparison of string to be

efficiently adapted and more accurately represent the original data set (Barnsley - col.

2, lines 48-56) in the comparison of the dataset or sequence data of bio-informatics

environment.

Contact Information

7.   Any inquiry concerning this communication should be directed to Anh Ly whose

telephone number is (703) 306-4527 or via E-Mail: **ANH.LY@USPTO.GOV**. The

examiner can be reached on Monday – Friday from 8:00 AM to 4:00 PM.

If attempts to reach the examiner are unsuccessful, see the examiner's

supervisor, Kim Vu, can be reached on (703) 305-4393.

Any response to this action should be mailed to:

Commissioner of Patents and Trademarks

Washington, D.C. 20231

or faxed to: (703) 746-7238 (after Final Communication)

or: (703) 746-7239 (for formal communications intended for entry)

or: (703) 746-7240 (for informal or draft communications, or Customer Service

Center, please label "PROPOSED" or "DRAFT")

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal

Drive, Arlington, VA, Fourth Floor (receptionist).

Inquiries of a general nature or relating to the status of this application should be

directed to the Group receptionist whose telephone number is (703) 305-3900.

AL
Feb. 11th, 2003.

HOSAIN T. ALAM
PRIMARY EXAMINER